

REMARKS

Claims 13-15 are pending and rejected in the present application.

Responsive to the rejections of claim 15 under 35 U.S.C. §112, first and second paragraphs, Applicants have amended claim 15 keeping in mind the comments offered by the Examiner. Applicants submit that claim 15 is now in
5 allowable form.

Responsive to the rejection of claims 13-15 under 35 U.S.C. §102(b) as being anticipated by any one of U.S. Patent Nos. 5,533,540, 5,427,622 and 5,579,792 (collectively referred to hereinafter as the Stanaslovich patents), Applicants respectfully traverse.

10 A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Claim 13 recites in part "generating two or more parallel sets of standing megasonic waves in a cleaning fluid" and "moving
15 the wafers in the cleaning fluid through said standing megasonic waves and transverse to the standing megasonic waves." (*Emphasis Added*). Applicants submit that the cited references fail to disclose such a limitation.

Generally, and in all embodiments, the devices of the Stanaslovich patents expose a given wafer to just one wave. No wafer is exposed to or moved

through more than one wave. The devices of the Stanaslovich patents translate a given wafer from side-to-side within a single wave, and in a direction that is either parallel to the travel of the wave or parallel to the wave front (i.e., perpendicular to the direction of wave travel). In contrast, the present invention
5 moves the wafers back-and-forth, and in a direction that is transverse to the waves, i.e., perpendicular to the direction of travel of the waves and perpendicular to (into and/or out of) the wave front. The wafers are thereby translated through more than one megasonic wave.

More particularly, the Stanaslovich patents with reference to Fig. 1
10 disclose that the megasonic transducers produce a pattern (or columns) of standing waves that extend from the bottom to the top within the liquid. The standing waves will have essentially the same vertical locations of peaks and nulls. As a result, the peaks and nulls of each wave occur at certain levels in the liquid. The peak amplitudes and the nulls of the waves remain essentially
15 constant as long as the depth of the liquid is constant. This produces a non-uniform cleaning action along the height of a wafer disposed in the liquid. (see *column 3, lines 38-52*).

The device shown in Fig. 1 of the Stanaslovich patents moves the wafers from side-to-side within the waves. The direction in which the wafers are
20 translated is along or parallel to the wave front of the megasonic waves. Each of

the wafers is translated along and/or within the same given or corresponding wave. Since, as taught by the Stanaslovic patents, the standing wave patterns have essentially the same vertical locations of peaks and nulls, such a side-to-side movement or translation of the wafers parallel to the megasonic wave does
5 nothing but translate a given wafer along the same energy level within a single wave. Thus, a given point of a wafer is exposed to the same energy, whether peak, null, or in between. The nulls are essentially dead or stagnant areas within the cleaning fluid that produce little or no cleaning action. Therefore, when a given portion of a wafer happens to correspond to and is translated along a null
10 within a wave, poor and/or non-uniform cleaning results. The device shown in Fig. 1 of the Stanaslovic patents does not move wafers in a direction transverse to the megasonic waves as claimed in the method of the present invention.

Further, the other devices taught in the Stanaslovich patents use anti-reflection mechanisms to prevent or substantially reduce the reflection of waves,
15 and thereby reduce or eliminate standing waves within the cleaning fluid. (see *column 4, lines 47-51*). Those devices move the wafers in a direction that is parallel to the direction of travel of the wave. Those devices do not move the wafers transverse to the megasonic waves as claimed in the method of the present invention.

In contrast, the present invention moves the wafers back-and-forth in a direction transverse to waves. The wafers are moved in a direction that is perpendicular to the direction of travel of the waves and perpendicular to (into and/or out of) the wave front. The wafers are thereby moved through different
5 standing waves. The different waves have respective peaks and nulls at different and various heights within the fluid, and each point on the wafers will therefore be exposed to various energy levels of the different waves. By moving the wafers transverse rather than parallel to the wave, a particular wafer or any given portion thereof will not be exposed only to a dead or stagnant zone within the
10 fluid, and more uniform and improved cleaning is achieved.

For the foregoing reasons, Applicants submit that the Stanaslovich patents fail to disclose moving wafers in a direction transverse to the megasonic waves, as recited in part by claim 13. Since the Stanaslovich patents fail to disclose each and every element as set forth in claim 13, they do not anticipate the claim.

15 Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of claim 13 and claim 14 depending therefrom.

Claim 15 recites in part “dispersing the waves in a divergent manner” and “exposing the semiconductor wafers to the dispersed megasonic waves within the cleaning fluid”. (*Emphasis Added*). Applicants submit that the cited

references fail to disclose or suggest such limitations, and therefore do not anticipate the claim.

The devices disclosed in the Stanasolovich patents cancel and/or absorb megasonic waves. Canceling or absorbing the waves is not the same as
5 dispersing waves. Thus, the Stanasolovich patents do not teach dispersing the megasonic waves. Further, the Stanasolovich patents cancel waves that are traveling away from the wafers and which would otherwise be reflected back toward the wafers. Only after the waves have passed by and/or impacted the wafers are the waves absorbed or canceled by destructive interference. The
10 Stanasolovich patents do not disperse or otherwise deflect megasonic waves prior to their impact upon the wafers. The Stanasolovich, et al., patents do not teach dispersing the megasonic waves before they reach or impact upon the wafers. Thus, the Stanasolovich, et al., patents fail to disclose dispersing the waves in a divergent manner and exposing the semiconductor wafers to the
15 dispersed megasonic waves, as recited in part by claim 15.

The Examiner states that the waves would be dispersed by the holders and/or the wafers, thereby exposing the wafers to dispersed waves. However, the Stanasolovich patents contain no such teaching or disclosure. The rejection, therefore, is apparently based on the principle of inherency.

To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.

Inherency, however, may not be established by probabilities or possibilities. The
5 mere fact that a certain thing may result from a given set of circumstances is not sufficient. See *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999). Applicants submit that inherency has not been established in regard to claim 15.

The Stanasolovich patents specifically address the problem of non-
10 uniform cleaning of wafers disposed in a cleaning fluid or liquid due to standing waves therein. These standing waves exist despite the presence of the wafers and holders in the cleaning fluid. If the megasonic waves were, in fact, significantly dispersed by the holder and/or other wafers the problem to which the Stanasolovich patents are directed would not have existed and the patents would
15 lack utility. Inherently, the existence of the Stanasolovich patents show that the holder and/or wafers do not significantly disperse the megasonic waves. The only reasonable inference that can be drawn from the existence of the Stanasolovich patents is that the presence of the holder and/or wafers in the cleaning fluid does not significantly disperse the megasonic waves.

For the foregoing reasons, Applicants submit that the evidence makes clear that the missing descriptive matter, i.e., the dispersing of the megasonic waves by the holder and/or wafers, is not necessarily present in the thing described in the reference. Therefore, Applicants submit that the cited reference
5 does not inherently disclose that the holder and/or wafers disperse the megasonic waves. Accordingly, Applicants submit that inherency has not been established, and respectfully request withdrawal of the rejection and allowance of claim 15.

Responsive to the objection to the Amendment filed 22 September 2003
10 under 35 U.S.C. §132, Applicants have amended claim 15 keeping in mind the comments offered by the Examiner. Applicants submit that claim 15 is now in allowable form.

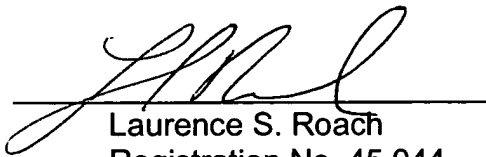
For all the foregoing reasons, Applicants submit that the pending claims are definite and do particularly point out and distinctly claim the subject matter
15 which Applicants regard as the invention. Moreover, Applicants submit that the pending claims are also in condition for allowance. Accordingly, Applicants respectfully request withdrawal of all objections and allowance of the claims.

PATENT
90065.161701(17732.6310.003)
Reply to Final Office Action of 24 Nov. 2003

The Examiner is invited to telephone the undersigned in regard to this
Amendment and the above identified application.

Respectfully submitted,

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Date


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